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SUBMARINE ESCAPE AND RESCUE

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August 1973

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DDC-TAS-73-39

SUBMARINE ESCAPE AND RESCUE

A DDC BIBLIOGRAPHY

**DDC-TAS
Cameron Station
Alexandria, Va. 22314**

AUGUST 1973

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18. SUPPLEMENTARY NOTES Updates AD-674 330																	
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">*Submarine Escape</td> <td style="width: 33%;">Naval Training</td> <td style="width: 33%;">Mooring</td> </tr> <tr> <td>*Submarines</td> <td>Submarine Personnel</td> <td>Ocean Bottom</td> </tr> <tr> <td>Underwater Vehicles</td> <td>Pressure Vessels</td> <td>Abandonment</td> </tr> <tr> <td>Bibliographies</td> <td>Salvage</td> <td>Sea Rescues</td> </tr> <tr> <td>Deep Submergence</td> <td>Survival Recovery</td> <td>(See reverse)</td> </tr> </table>			*Submarine Escape	Naval Training	Mooring	*Submarines	Submarine Personnel	Ocean Bottom	Underwater Vehicles	Pressure Vessels	Abandonment	Bibliographies	Salvage	Sea Rescues	Deep Submergence	Survival Recovery	(See reverse)
*Submarine Escape	Naval Training	Mooring															
*Submarines	Submarine Personnel	Ocean Bottom															
Underwater Vehicles	Pressure Vessels	Abandonment															
Bibliographies	Salvage	Sea Rescues															
Deep Submergence	Survival Recovery	(See reverse)															
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This bibliography comprises citations of unclassified reports dealing with submarine escape and rescue, deep submergence vessels, search techniques and exploration. The following references are on some of the topics dealing with the subject: submarine escape, sea rescue, submarine personnel, naval training, underwater vehicles, and sea rescue equipment. <i>(See reverse)</i>																	

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SECURITY CLASSIFICATION OF THIS PAGE(When Data Entered)

(Item 19, Cont'd) KEY WORDS

Sea Rescue Equipment	Human Engineering
Search Theory	Marine Engineering
Submarine Escape Suits	Safety

(Item 20, Cont'd) REMARKS

Corporate Author-Monitoring Agency, Subject, Title,
Personal Author, Contract, and Report Number Indexes
are included.

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SECURITY CLASSIFICATION OF THIS PAGE(When Data Entered)

FOR E W O R D

This bibliography, entitled *Submarine Escape and Rescue*, contains 29 unclassified references. Bibliographic citations have been selected from documents processed into the Defense Documentation Center's data bank between January 1968 and June 1973 and updates AD-674 330.

The bibliography is arranged by AD sequence within the two subject areas:

- I. Submarine Escape and Rescue
- II. Deep Submergence Vessels, Search Techniques and Exploration

Corporate Author-Monitoring Agency, Subject, Title, Personal Author, Contract, and Report Number Indexes are included.

BY ORDER OF THE DIRECTOR, DEFENSE SUPPLY AGENCY

OFFICIAL



HUBERT E. SAUTER
Acting Administrator
Defense Documentation Center

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TITLE.....	T-1
PERSONAL AUTHOR.....	P-1
CONTRACT.....	C-1
REPORT NUMBER.....	R-1

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I. SUBMARINE ESCAPE AND RESCUE

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZCAI2

AD-666 398 6/5 6/19
LIBRARY OF CONGRESS WASHINGTON D C AEROSPACE TECHNOLOGY
DIV

SOVIET NAVAL MEDICINE AND UNDERWATER PHYSIOLOGY. (U)

DESCRIPTIVE NOTE: TECHNICAL TRANSLATION.

FEB 68 128P
REPT. NO. ATD-67-7

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPORT OF SURVEYS OF FOREIGN
SCIENTIFIC AND TECHNICAL LITERATURE.

DESCRIPTORS: (*MILITARY MEDICINE, USSR), REPORTS,
NAVAL PERSONNEL, SUBMARINE PERSONNEL, ARMED
FORCES(FOREIGN), NAVAL TRAINING, UNDERWATER,
DIVING, DECOMPRESSION SICKNESS,
STRESS(PHYSIOLOGY), HYPOXIA, WATER,
PURIFICATION, MAINTENANCE PERSONNEL, SUBMARINE
ESCAPE, SCUBA DIVERS, BREATHING APPARATUS,

BIONICS

IDENTIFIERS: TRANSLATIONS

(U)

(U)

CONTENTS: APPLIED SUBMARINE AND MARITIME
MEDICINE; THE TRAINING OF SUBMARINE CREWS AND
DIVERS; THE SEALAB PROGRAM, DIVING TECHNOLOGY,
AND GENERAL PROBLEMS OF UNDERWATER PHYSIOLOGY;
PROBLEMS OF DECOMPRESSION SICKNESS (CAISSON
DISEASE); PROBLEMS OF RESPIRATION UNDER HYPEROXIC
CONDITIONS; PROBLEMS OF HYPOXIA; AIR PURIFICATION
AND PROBLEMS OF SHIP DRINKING WATER SYSTEMS;
MISCELLANEOUS (BIONICS AND BIOACOUSTICS).

(U)

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UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZCAI2

AD-668 809 6/17 6/7

NAVAL SUBMARINE MEDICAL CENTER GROTON CONN SUBMARINE
MEDICAL RESEARCH LAB

PHYSIOLOGICAL EVALUATION OF THE BRITISH MARK VII
SUBMARINE ESCAPE IMMERSION SUIT DURING IMMERSION. (U)

MAR 61 28P HALL, DAVID A., NOBEL, JOEL
J. SANTA MARIA LOUIS J. :
REPT. NO. SMRL-514
PROJ: NAVMED-MF022-03-03-9027
TASK: MF022-03-03-9027-03

UNCLASSIFIED REPORT

DESCRIPTORS: (*UNDERWATER CLOTHING,
PERFORMANCE (ENGINEERING)), (*SUBMARINE ESCAPE,
UNDERWATER CLOTHING), SUBMARINE PERSONNEL,
SURVIVAL, COLD WEATHER TESTS, EXPOSURE, HANDS,
FEET, MORTALITY RATES, TIME STUDIES, CORRELATION
TECHNIQUES, THEORY, ELECTROCARDIOGRAPHY,
PREDICTIONS, DAMAGE ASSESSMENT,
STRESS (PHYSIOLOGY), GREAT BRITAIN (U)

IDENTIFIERS: *SUBMARINE ESCAPE IMMERSION SUITS,
SEIS (SUBMARINE ESCAPE IMMERSION SUIT) (U)

THIS STUDY DETERMINES THE GENERAL PERFORMANCE AND
SURVIVAL TIME AFFORDED BY THE BRITISH MARK VII
SUBMARINE ESCAPE IMMERSION SUIT (SEIS), IN
29 DEGREES F. WATER, 10 DEGREES F. AIR, AND 20
MPH WIND SPEED. IT WAS FOUND THAT THE BRITISH
SUIT DID NOT PROVIDE THE 24-HOUR ESTIMATED SURVIVAL
TIME AT THE SEVERE CONDITIONS LISTED ABOVE, AND THE
FOUR SUBJECTS WERE TAKEN FROM THE WATER AFTER AN
AVERAGE TIME OF 2.8 HOURS OF EXPOSURE. DAMAGE TO
THE HANDS AND FEET WOULD PROBABLY OCCUR BETWEEN 5.1
AND 9.1 HOURS. DEATH WOULD PROBABLY OCCUR AFTER
5.6 TO 24 HOURS OF EXPOSURE. TESTS WERE ALSO
CONDUCTED IN 30 DEGREES F. WATER AND 85 DEGREES
F., IN STILL AIR. THESE TESTS INDICATED THAT NO
MAJOR PROBLEM WILL BE ENCOUNTERED UNDER THESE
CONDITIONS. THE ENVIRONMENTAL CONDITIONS WERE THEN
CHANGED IN A STEP-WISE FASHION FROM 29 DEGREES F.
WATER, 10 DEGREES F. AIR, AND 20 MPH WIND, UNTIL
24-HOUR ESTIMATED SURVIVAL TIME WAS OBTAINED. AT
44 DEGREES F. WATER, 32 DEGREES F. AIR, AND 20
MPH WIND, 24-HOUR SURVIVAL MAY BE PREDICTED FOR
MOST MEN, BASED ON RESULTS IN THE LIMITED NUMBER OF
SUBJECTS USED IN THIS INVESTIGATION. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZCAI2

AD-670 613 6/19

NAVAL SUBMARINE MEDICAL CENTER GROTON CONN SUBMARINE
MEDICAL RESEARCH LAB

EVALUATION OF THE RAPID RECOMPRESSION-HIGH PRESSURE
OXYGENATION APPROACH TO THE TREATMENT OF TRAUMATIC
CEREBRAL EMBOLISM.

(U)

MAR 68 14P VAN GENDEREN, LARRY JWAITE,
CHARLES L. ;
REPT. NO. SMRL-519
PROJ: NAVMED-MR005.04-0057.01

UNCLASSIFIED REPORT

DESCRIPTORS: (*GAS EMBOLISM, CEREBROVASCULAR
SYSTEM), THERAPY, OXYGEN, DIVING, SUBMARINE

(U)

ESCAPE, PRESSURE BREATHING, NAVAL PERSONNEL

(U)

IDENTIFIERS: RECOMPRESSION

THE STUDY COMPARES THE CONVENTIONAL NAVY
RECOMPRESSION TREATMENT TABLES AND THE NEWER RAPID
RECOMPRESSION-HIGH PRESSURE OXYGENATION (RR-HPO)
METHOD FOR THE TREATMENT OF TRAUMATIC CEREBRAL AIR
EMBOLISM. SEVEN CASES ARE PRESENTED. THESE
CASES OCCURRED AS A RESULT OF SUBMARINE ESCAPE
TRAINING AT THE NAVAL SUBMARINE BASE, GROTON,
CONNECTICUT, AND WERE SUCCESSFULLY TREATED WITH THE
LATTER METHOD. FACTORS REGARDING THE RATIONALE OF
THE USE OF THIS NEW APPROACH ARE DISCUSSED. SINCE
THE WRITING OF THIS PAPER, THE NAVY DEPARTMENT
HAS APPROVED THE TREATMENT SCHEDULES RECOMMENDED
HEREIN FOR THE TREATMENT OF TRAUMATIC AIR EMBOLISM.
(AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZCAI2

AD-674 330 6/7 5/2 13/10.1
DEFENSE DOCUMENTATION CENTER ALEXANDRIA VA

SUBMARINE ESCAPE AND RESCUE. VOLUME I. (U)

DESCRIPTIVE NOTE: BIBLIOGRAPHY REPT. FOR PERIOD ENDING
JUN 68.

AUG 68 124P
REPT. NO. DDC-TAS-68-1

UNCLASSIFIED REPORT

DESCRIPTORS: (*SUBMARINE ESCAPE, BIBLIOGRAPHIES),
(*SEA RESCUES, SUBMARINES), NUCLEAR POWERED
VESSELS, UNDERWATER VEHICLES, DEEP SUBMERGENCE,
SEA RESCUE EQUIPMENT, ACCIDENTS, UNDERWATER
COMMUNICATION SYSTEMS, SUBMARINE HULLS, OCEAN BOTTOM
TOPOGRAPHY, OCEAN CURRENTS, ABSTRACTS, INDEXES (U)
IDENTIFIERS: SSN 585, SSN 589, SSN 593, MANNED
SUBMERSIBLES, ALVIN OCEANOGRAPHIC VESSEL, TRIESTE
OCEANOGRAPHIC VESSEL, ALUMINAUT OCEANOGRAPHIC
VESSEL, BATHYSCAPHS (U)

THE ANNOTATED BIBLIOGRAPHY ON SUBMARINE ESCAPE AND
RESCUE CONTAINS 96 REFERENCES AND WAS PREPARED AFTER
THE LOSS OF THE NUCLEAR ATTACK SUBMARINE SSN 589
(SCORPION). THE FOLLOWING SUBTOPICS ARE
INCLUDED: ALL PERTINENT REFERENCES ON THE
SCORPION, THRESHER, AND SKIPJACK CLASS OF
SUBMARINES; PERTINENT REFERENCES ON DEEP
SUBMERGENCE VESSELS; SEARCH TECHNIQUES AND
EXPLORATION; SUBMARINE ESCAPE AND RESCUE; PASSIVE
AND ACTIVE COMMUNICATION TO AND FROM THE DISTRESSED
CRAFT; POSSIBLE CAUSES OF ACCIDENTS IN SUBMARINES
AND OTHER UNDERWATER CRAFT. ARRANGED BY ACCESSION
NUMBER (AD) SEQUENCE IN EACH TOPICAL DIVISION. THIS
BIBLIOGRAPHY ALSO CONTAINS THREE COMPUTER-GENERATED
INDEXES; CORPORATE AUTHOR, PERSONAL AUTHOR
AND AD-NUMERIC. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZCAI2

AD-675 815 6/19 6/16
NAVAL SUBMARINE MEDICAL CENTER GROTON CONN SUBMARINE
MEDICAL RESEARCH LAB

PULMONARY AND CIRCULATORY ADJUSTMENT DETERMINING THE
LIMITS OF DEPTHS IN BREATHOLD DIVING. (U)

DESCRIPTIVE NOTE: INTERIM REPT.,
JUN 68 13P SCHAEFER, KARL E.; ALLISON,
ROBERT D.; DOUGHERTY, JAMES H., JR.; CAREY,
CHARLES R.; WALKER, ROGER;
REPT. NO. SMRL-531
MONITOR: NAVMED MR005.04-0054-1

UNCLASSIFIED REPORT

DESCRIPTORS: (*RESPIRATORY SYSTEM,
*STRESS(PHYSIOLOGY)), (*CARDIOVASCULAR SYSTEM,
STRESS(PHYSIOLOGY)), (*DIVING,
STRESS(PHYSIOLOGY)), BLOOD VOLUME, THORAX,
OXYGEN, CARBON DIOXIDE, LUNGS,
TOLERANCES(PHYSIOLOGY), HYPERVENTILATION, GAS
ANALYSIS, HYPOXIA, TABLES, SUBMARINE ESCAPE (U)

DATA ON PULMONARY GAS EXCHANGE WERE COLLECTED IN
BREATHOLD DIVES TO 90 FEET AT THE ESCAPE
TRAINING TANK, NAVAL SUBMARINE BASE,
GROTON, CONN. AND IN OPEN SEA BREATHOLD DIVES,
OFF FT. LAUDERDALE, TO A DEPTH OF 217.5 FEET ON
DIVER R. CROFT. THORACIC BLOOD VOLUME
DISPLACEMENTS WERE MEASURED AT DEPTHS OF 25, 50, 90,
AND 130 FEET, USING THE IMPEDANCE PLETHYSMOGRAPH.
THE OPEN SEA DIVES WERE CARRIED OUT WITH AN AVERAGE
SPEED OF DESCENT OF 3.95 FEET PER SECOND USING A 65-
POUND CABLE BREAK AND AN AVERAGE RATE OF ASCENT OF
3.50 FEET PER SECOND PULLING UP THE LINE. END DIVE
ALVEOLAR OXYGEN TENSIONS DID NOT FALL BELOW 40 MM
HG, WHILE ALVEOLAR CO₂ TENSION DID NOT RISE ABOVE
40 MM HG EXCEPT IN ONE CASE. THESE FINDINGS
INDICATE THAT NEITHER HYPOXIA NOR HYPERCAPNIA
DETERMINED THE DEPTH LIMITS UNDER THOSE CONDITIONS.
AT DEPTHS OF 90 AND 130 FEET BLOOD WAS FORCED INTO
THE THORAX, AMOUNTING TO 1047 AND 850 ML
RESPECTIVELY. THIS IS THE FIRST DIRECT EVIDENCE OF
INTRATHORACIC BLOOD POOLING IN BREATHOLD DIVING AT
GREATER DEPTHS. IT EXPLAINS THE EXTENSION OF
CROFT'S 197-FOOT DEPTH THRESHOLD CALCULATED FROM
HIS TOTAL LUNG VOLUME/RESIDUAL VOLUME RATIO TO DEPTHS
OF 217.5 FEET ACTUALLY REACHED IN HIS WORLD RECORD
DIVE. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZCAI2

AD-685 627 6/19 6/7
NAVAL SUBMARINE MEDICAL CENTER GROTON CONN SUBMARINE
MEDICAL RESEARCH LAB

EXTRA-ALVEOLAR AIR RESULTING FROM SUBMARINE ESCAPE
TRAINING: A POST-TRAINING ROENTGENOGRAPHIC SURVEY
OF 170 SUBMARINERS.

(U)

DESCRIPTIVE NOTE: INTERIM REPT.,
OCT 68 16P JAMES, RFESE E. ;
REPT. NO. SMRL-550
MONITOR: NAVMED MF022.03.03-9025-32

UNCLASSIFIED REPORT

DESCRIPTORS: (*SUBMARINE ESCAPE, *GAS EMBOLISM),
CASUALTIES, X-RAY PHOTOGRAPHY, DIAGNOSIS,
RADIOGRAPHY, THORAX, SUBMARINE PERSONNEL,
TRAINING, MORTALITY RATES

(U)

IDENTIFIERS: *AEROEMBOLISM, *EXTRAALVEOLAR
AIR

(U)

SUBMARINE ESCAPE TRAINING FOR SUBMARINE PERSONNEL HAS BEEN CONDUCTED BY THE U. S. NAVY SINCE 1930. BY 1957, MORE THAN 250,000 ASCENTS HAD BEEN RECORDED. MOST CASUALTIES DUE TO THIS TRAINING INVOLVED EXTRA-ALVEOLAR AIR AND/OR EMBOLISM, AND THOSE FEW CASUALTIES WHICH HAVE OCCURRED HAD USUALLY BEEN RECORDED AND REPORTED. IN VIEW OF THIS, SEVERAL QUESTIONS WERE ASKED, AMONG THEM ONE CONCERNING THE INCIDENCE OF EXTRA-ALVEOLAR AIR AFTER SUBMARINE ESCAPE TRAINING IN PERSONNEL WHO ARE NOT CONSIDERED TO BE CASUALTIES. CHEST ROENTGENOGRAMS OF 170 PERSONNEL TAKEN IMMEDIATELY AFTER UNDERGOING ROUTINE SUBMARINE ESCAPE TRAINING WERE EXAMINED. TWO MEN WERE FOUND TO HAVE ROENTGENOGRAPHIC EVIDENCE OF EXTRA-ALVEOLAR AIR. THE CLOSE ASSOCIATION OF EXTRA-ALVEOLAR AIR WITH AIR EMBOLISM IS POSTULATED AND THE TRUE INCIDENCE OF THESE ENTITIES AFTER SUBMARINE ESCAPE TRAINING IS QUESTIONED. IT WAS CONCLUDED THAT THE INCIDENCE OF AIR EMBOLI AND/OR EXTRA-ALVEOLAR AIR FOLLOWING SUBMARINE ESCAPE TRAINING MAY BE MUCH GREATER THAN PREVIOUSLY SUSPECTED. (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZCAI2

AD-694 937 6/17 13/10.1
NAVY EXPERIMENTAL DIVING UNIT WASHINGTON D C

SIMULATED SUBMARINE ESCAPES FROM 33, 100, 240 AND
495 FEET OF SEAWATER. (U)

DESCRIPTIVE NOTE: RESEARCH REPT.,
MAY 69 43P SUMMITT, JAMES K.; HERRON,
JERRY M.; FLYNN, EDWARD T.; HALL, DAVID A.;

REPT. NO. NEDU-RR-4-69

UNCLASSIFIED REPORT

DESCRIPTORS: (*SUBMARINE ESCAPE, SIMULATION),
SUBMARINE PERSONNEL, DECOMPRESSION SICKNESS,

(U)

TOLERANCES(PHYSIOLOGY), SEA RESCUE EQUIPMENT

IDENTIFIERS: *MARK-7 SUBMARINE ESCAPE IMMERSION

(U)

EQUIPMENT

TWO EXPERIMENTAL SUBJECTS WERE SEQUENTIALLY EXPOSED
TO A SERIES OF SIMULATED SUBMARINE ESCAPES TO 33,
100, 240 AND 495 FEET OF SEAWATER IN THE WET CHAMBER
AT THE EXPERIMENTAL DIVING UNIT. THE

BRITISH SUBMARINE ESCAPE IMMERSION

EQUIPMENT (SEIF) WAS USED ALONG WITH A RAPID
COMPRESSION/DECOMPRESSION TECHNIQUE. BOTH SUBJECTS
TOLERATED THE PROCEDURES EXTREMELY WELL. MILD
DISORIENTATION, EUPHORIA AND DISCOMFORT WERE
EXPERIENCED ON THE 495 FOOT RUNS PROBABLY SECONDARY
TO THE HEAT OF COMPRESSION, EARLY NITROGEN NARCOSIS,
ETC. PHYSICAL EXAMINATIONS AFTER EACH EXPERIMENTAL
RUN WERE ALL WITHIN NORMAL LIMITS. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZCAI2

AD-705 175 13/10.1 6/7
LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF

PRELIMINARY PLANNING STUDY FOR RESCUE OF DISTRESSED SURMERSIBLES. (U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT.
MAY 69 209P

REPT. NO. LMSC-D023780-1
CONTRACT: DOT-CG-93019-A

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEA RESCUE EQUIPMENT, UNDERWATER VEHICLES), (*UNDERWATER VEHICLES, DESIGN), SEA RESCUES, MISSION PROFILES, SYSTEMS ENGINEERING, HUMAN ENGINEERING, UNDERWATER EQUIPMENT, COAST GUARD RESEARCH, COSTS, ADVANCED PLANNING (U)

IDENTIFIERS: *MANAGEMENT INFORMATION SYSTEMS (U)

THE BASIC OBJECTIVE OF THE STUDY WAS TO PROVIDE THE U. S. COAST GUARD WITH PRELIMINARY TECHNICAL DATA AND PROGRAM PLANNING INFORMATION NECESSARY TO DEFINE THE DEVELOPMENT OF AN INITIAL DISTRESSED SURMERSIBLE RESCUE CAPABILITY AND THE COSTS ASSOCIATED WITH THAT DEVELOPMENT. THE FINAL STUDY OUTPUT IS THIS SUMMARY REPORT IN WHICH SYSTEM CONCEPT DESCRIPTIONS ARE PROVIDED AND DATA ON ESTIMATED COSTS SUPPLIED. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZCAI2

AD-709 463 6/7 12/1
COAST GUARD WASHINGTON D C APPLIED TECHNOLOGY DIV

BIBLIOGRAPHY OF MARITIME SEARCH THEORY AND
BACKGROUND MATERIAL ON OPERATIONS RESEARCH. (U)

JUL 70 14P BANOWETZ, VIRGIL L.
PROJ: CG-711202/004

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEARCH THEORY, *BIBLIOGRAPHIES),
(*OPERATIONS RESEARCH, *SEA RESCUES), SURVIVAL,
MARINE METEOROLOGY, UNDERWATER VEHICLES, DEEP
SUBMERGENCE (U)

THE ITEMS IN THE BIBLIOGRAPHY RELATE TO THE
OPERATIONS RESEARCH OF PLANNING A MARITIME SEARCH.
(AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZCAI2

AD-709 552 6/7 5/9

NAVAL SUBMARINF MEDICAL CENTER GROTON CONN SUBMARINE
MEDICAL RESEARCH LAB

EXPERIMENTAL TRAINING FOR OPEN-SEA SUBMARINE
ESCAPE.

(U)

DESCRIPTIVE NOTE: INTERIM REPT.,

MAR 70 41P PARKER, JAMES W. ; HALL,

DAVID A. ;

REPT. NO. SMRL-622

PROJ: MF12.524.006

MONITOR: NAVMED MF12.524.006.9025B-35

UNCLASSIFIED REPORT

DESCRIPTORS: (*SUBMARINE ESCAPE, NAVAL TRAINING),
INSTRUCTION MANUALS, SEA RESCUES, UNDERWATER
VEHICLES, TESTS, SAFETY

(U)

A PILOT SYLLABUS WAS DEVELOPED FOR THE PURPOSE OF
TRAINING NON-DIVER VOLUNTEER SUBJECTS FOR ESCAPES
FROM A SUBMERGED SUBMARINE AT DEPTHS DOWN TO 100
FEET. FIVE VOLUNTEERS WERE PUT THROUGH THE
TRAINING. THE SYLLABUS INCLUDED CLASSROOM, LADDER
TRAINING, BUOYANT ASCENT TRAINING, STEINKE HOOD
TRAINING AND MARK VII SUBMARINE ESCAPE
IMMERSION EQUIPMENT TRAINING FROM THE 50 AND 100
FOOT LEVELS OF THE ESCAPE TRAINING TANK.
(AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZCAI2

AD-709 911 6/7

NAVAL SUBMARINE MEDICAL CENTER GROTON CONN SUBMARINE
MEDICAL RESEARCH LAB

OPEN SEA, SURFACE EVALUATION OF SUBMARINE ESCAPE
AND IMMERSION EQUIPMENT.

(U)

FEB 70 25P PARKER, JAMES W. SHALL,
DAVID A. MELLON, JOHN J. ;
REPT. NO. SMRL-614
PROJ: MF12.524
TASK: MF12.524.006
MONITOR: NAVMED MF12.524.0069025B34-1

UNCLASSIFIED REPORT

DESCRIPTORS: (*SUBMARINE ESCAPE, *SEA RESCUE
EQUIPMENT), TESTS, PROTECTIVE CLOTHING, LIFE
RAFTS, SEA RESCUES, MOTION SICKNESS

(U)

IDENTIFIERS: *SEIE(SUBMARINE ESCAPE IMMERSION
EQUIPMENT), *SUBMARINE ESCAPE IMMERSION
EQUIPMENT, *SEIS, *SUBMARINE ESCAPE IMMERSION
SUITS), *SUBMARINE ESCAPE IMMERSION SUITS

(U)

THE MARK VII SUBMARINE ESCAPE AND
IMMERSION SUIT AND THE ACED HOODED
IMMERSION SUIT, RAFT, WERE SUBJECTED TO OPEN
SEA EVALUATION USING FIVE INEXPERIENCED SUBJECTS AND
EIGHT EXPERIENCED SUBMARINE ESCAPE TANK
INSTRUCTORS/DIVERS AS SUBJECTS. THE SEA STATES
EXPERIENCED VARIED FROM SEA STATE 1 (SMOOTH) TO
SEA STATE 4 (ROUGH). (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZCAI2

AD-709 912 6/7

NAVAL SUBMARINE MEDICAL CENTER GROTON CONN SUBMARINE
MEDICAL RESEARCH LAB

SIMULATED DEEP SUBMARINE ESCAPE FROM 459 FEET OF
SEA WATER.

(U)

MAR 70 37P HALL, DAVID A.; SUMMITT,
JAMES K.;
REPT. NO. SMRL-617
PROJ: MF12.524
TASK: MF12.524.006
MONITOR: NAVMED MF12.524.0069025B34-2

UNCLASSIFIED REPORT

DESCRIPTORS: (*SUBMARINE ESCAPE, SIMULATION),
SEA RESCUE EQUIPMENT, DECOMPRESSION SICKNESS,
NAVAL RESEARCH, PROTECTIVE CLOTHING, NITROGEN,
TOXICITY

(U)

IDENTIFIERS: *SUBMARINE ESCAPE IMMERSION EQUIPMENT,
*SEIE(SUBMARINE ESCAPE IMMERSION EQUIPMENT),
EASE(ESCAPE AND SURVIVAL EQUIPMENT), ESCAPE
AND SURVIVAL EQUIPMENT, SEIS(SUBMARINE ESCAPE
IMMERSION SUITS), SUBMARINE ESCAPE IMMERSION
SUITS, AIR EMBOLISM

(U)

A SERIES OF DEEP SIMULATED SUBMARINE ESCAPES WERE
CONDUCTED UTILIZING THE BRITISH MARK VII
SUBMARINE ESCAPE IMMERSION EQUIPMENT (SEIE).
TWO ESCAPEE SUBJECTS WERE EXPOSED IN A STEP-WISE
FASHION TO 2, 4, 8 AND 16 ATA AND BROUGHT DIRECTLY
TO THE SURFACE. A RAPID COMPRESSION/DECOMPRESSION
METHOD WAS USED EMPLOYING THE WET CHAMBER AT THE
EXPERIMENTAL DIVING UNIT. THE ABOVE ESCAPES
WERE SAFELY PERFORMED WITHOUT DECOMPRESSION STOPS OR
RECOMPRESSION. THE ANTICIPATED PROBLEMS OF SPEED OF
COMPRESSION, HEAT OF COMPRESSION, CO₂ POISONING,
O₂ POISONING, NITROGEN NARCOSIS AND DECOMPRESSION
SICKNESS WERE NOT ENCOUNTERED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZCAI2

AD-709 995 . 6/7 6/11 15/7
BATTELLE MEMORIAL INST COLUMBUS OHIO COLUMBUS LABS
PORTABLE RECOMPRESSION CHAMBER ENVIRONMENTAL CONTROL
SYSTEM STUDY. (U)

DESCRIPTIVE NOTE: FINAL REPT. 1 FEB-31 JUL 70.
JUL 70 45P CAUDY, DON W. ;GLASGOW,
JAMES S. ;
CONTRACT: N00014-70-C-0072

UNCLASSIFIED REPORT

DESCRIPTORS: (*DECOMPRESSION SICKNESS, RESCUES),
(*DEEP SUBMERGENCE, DECOMPRESSION SICKNESS),
CONTROL SYSTEMS, PORTABLE, CASUALTIES,
RESPIRATION, GAS FLOW, COMMUNICATION SYSTEMS,
DESIGN, NAVAL RESEARCH (U)

IDENTIFIERS: PORTABLE RECOMPRESSION CHAMBERS, *AIR
EMBOLISM, *DECOMPRESSION CHAMBERS (U)

A FEASIBILITY STUDY WAS MADE OF A RELIABLE,
PORTABLE, LIGHTWEIGHT ENVIRONMENTAL CONTROL SYSTEM
FOR USE WITH A RECOMPRESSION CHAMBER. THE REPORT
PRESENTS THE RESULTS OF THE STUDY AND RECOMMENDATIONS
FOR SYSTEM DEVELOPMENT. A TANK-SUPPLIED OPEN-
CIRCUIT SYSTEM FOR BREATHING-GAS SUPPLY TO THE
PORTABLE RECOMPRESSION CHAMBER IS THE SIMPLEST,
EASIEST TO OPERATE, AND MOST RELIABLE SYSTEM.
HOWEVER, EXCEPT FOR INSTANCES WHERE A LARGE SUPPLY
OF COMPRESSED AIR IS AVAILABLE, IT IS IMPRACTICAL.
SEMICLOSED-CIRCUIT AND COMPRESSOR-SUPPLIED OPEN-
CIRCUIT SYSTEMS APPEAR TO OFFER EXCELLENT
ALTERNATIVES TO THE TANK-SUPPLIED SYSTEM WITHOUT AN
UNREASONABLE INCREASE IN COMPLEXITY. A CLOSED-
CIRCUIT SYSTEM DOES NOT APPEAR TO OFFER ANY MAJOR
ADVANTAGES FOR THIS APPLICATION WHICH WOULD OFFSET
ITS DECREASED RELIABILITY AND INCREASED COST.

(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZCAI2

AD-711 602 6/7

NAVAL AIR DEVELOPMENT CENTER JOHNSVILLE PA AEROSPACE CREW EQUIPMENT DEPT

PHYSIOLOGICAL EVALUATION OF THE ACED SUBMARINE ESCAPE SUIT-RAFT SYSTEM.

(U)

DESCRIPTIVE NOTE: INTERIM REPT.,

MAY 70 25P SANTAMARIA, LOUIS J. ;

REPT. NO. NADC-AC-7006

PROJ: S4607

TASK: 11894

UNCLASSIFIED REPORT

DESCRIPTORS: (*SUBMARINE ESCAPE, *SEA RESCUE EQUIPMENT), LIFE RAFTS, PROTECTIVE CLOTHING, EXPOSURE, WATER, TEMPERATURE, PHYSIOLOGY, TISSUES(BIOLOGY), DAMAGE, MORTALITY RATES, STRESS(PHYSIOLOGY), TOLERANCES(PHYSIOLOGY) (U)

IDENTIFIERS: *SUBMARINE ESCAPE SYSTEMS (U)

SUBJECTS EQUIPPED WITH THE ACED SUBMARINE ESCAPE SUIT SYSTEM AND USING A RAFT WITH INFLATABLE FLOOR AND CANOPY TOLERATED EXPOSURES OF APPROXIMATELY 8 HR IN 29F WATER AND 24 HR IN 44F WATER TEMPERATURE.

THE FOLLOWING ITEMS MADE UP THE SUIT ASSEMBLY:

RHOVYL UNDERWEAR, USAF WINTER FLYING SUIT, QD-1 IMPERMEABLE GARMENT, STEINKE HOOD, NYLON GLOVES, WOOL INSERTS AND USN EXPOSURE MITTENS, 2 PAIRS OF WOOL SOCKS, AND DOUBLE-WALLED WET SUIT BOOTIES. IN

29F WATER TEMPERATURE, TISSUE DAMAGE IN APPROXIMATELY 12 HR AND DEATH IN >24 HR ARE PREDICTED; IN AN ENVIRONMENT OF 44F WATER TEMPERATURE USING THE SAME SUIT-RAFT SYSTEM, TISSUE DAMAGE AND DEATH ARE PROJECTED WELL BEYOND 24 HR, ON THE BASIS OF DATA OBSERVED IN A ONE-MAN TEST.

(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZCAI2

AD-712-546 07 13/10
BATTELLE MEMORIAL INST COLUMBUS OHIO COLUMBUS LABS

MARK I DEEP DIVE SYSTEM (DDS-1) HANDLING STUDY.
PHASE I. CONCEPTUAL DESIGN. (U)

DESCRIPTIVE NOTE: SUMMARY TECHNICAL REPT.,
OCT 70 120P DOERSCHUK, DAVID C. PADKINS,
DAVID E. GLASGOW, JAMES S. ;
CONTRACT: N00014-70-C-0072

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEA RESCUE EQUIPMENT, DESIGN),
(*HOISTS, DESIGN), (*UNDERWATER VEHICLES,
RESCUES), DEPLOYMENT, RECOVERY, SAFETY,
ALIGNMENT, PERFORMANCE(ENGINEERING),
FEASIBILITY STUDIES, SHIPS, MOTION, COMPUTER
PROGRAMS (U)

IDENTIFIERS: TELESCOPING CRANES, MARK 1 DEEP DIVE
SYSTEM (U)

THE REPORT COVERS SELECTION OF AN OPTIMAL CONCEPT
FOR HANDLING THE MARK I DEEP DIVE SYSTEM'S
PERSONNEL TRANSFER CAPSULE, IN A SEA STATE
3, FROM ATS, ASR, AND ARS CLASS SHIPS.
INCLUDED ARE DESCRIPTIONS OF SOME OF THE MANY
POSSIBLE HANDLING SYSTEM CONCEPTS GENERATED BY IDEA
CONFERENCE AND A LITERATURE SEARCH. THE MORE
FEASIBLE CONCEPTS ARE ANALYZED AND COMPARED USING A
SET OF ELEVEN COMPARISON FACTORS. THE OPTIMAL
SYSTEM, AN ARTICULATED TELESCOPING CRANE, IS CHOSEN
ACCORDING TO ITS OVERALL PERFORMANCE ON THE
COMPARISON FACTORS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZCAI2"

AD-715 103 5/9

NAVAL PERSONNEL RESEARCH AND DEVELOPMENT LAB WASHINGTON D C

PERSONNEL AND TRAINING REQUIREMENTS FOR THE
DEEP SUBMERGENCE RESCUE VEHICLE (DSRV).

(U)

DESCRIPTIVE NOTE: PRELIMINARY REPT. JAN-SEP 70,
OCT 70 37P NOBLE, JOHN F. ;
REPT. NO. WRR-71-3

UNCLASSIFIED REPORT

DESCRIPTORS: (*NAVAL PERSONNEL, UNDERWATER
VEHICLES), (*NAVAL TRAINING, UNDERWATER
VEHICLES), DEEP SUBMERGENCE, SEA RESCUES,
MAINTENANCE, INSTRUCTORS

(U)

IDENTIFIERS: DSRV(DEEP SUBMERGENCE RESCUE
VEHICLES), DEEP SUBMERGENCE RESCUE VEHICLES,
MANAGED SUBMERSIBLES

(U)

THE REPORT IS CONCERNED WITH THE IDENTIFICATION OF
PERSONNEL AND TRAINING REQUIREMENTS FOR THE DEEP
SUBMERGENCE RESCUE VEHICLE (DSRV).

INFORMATION WILL BE UTILIZED IN ESTABLISHING
SUBSEQUENT TRAINING COURSES AND THE INITIAL TRAINING
SITE FOR ASR-21 AND ASR-22 PERSONNEL.

(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZCAI2

AD-718-855 627 13/10.1 5/5
NAVAL SUBMARINE MEDICAL CENTER GROTON CONN SUBMARINE
MEDICAL RESEARCH LAB

HUMAN FACTORS EVALUATION OF SUBMARINE
ESCAPE: IA. INDIVIDUAL AND GROUP ESCAPE
WITH THE BRITISH SUBMARINE ESCAPE IMMERSION
SUIT AND THE STEINKE HOOD UNDER CONDITIONS
OF SIDE AND TUBE EGRESS.

(U)

DESCRIPTIVE NOTE: INTERIM REPT.,
APR 70 28P RYACK, BERNARD L.; RODENSKY,
ROBERT L.; WALTERS, GARY B.;
REPT. NO. SMRL-624
PROJ: MR12.524.006
MONITOR: NAVMED MR12.524.006-9025B-36

UNCLASSIFIED REPORT

DESCRIPTORS: (*SUBMARINE ESCAPE, HUMAN
ENGINEERING), DECOMPRESSION SICKNESS, TIME,
CORRELATION TECHNIQUES, REGRESSION ANALYSIS,
HATCHES, SUBMARINE PERSONNEL, SEA RESCUE
EQUIPMENT

(U)

IDENTIFIERS: MARK 7 SUBMARINE ESCAPE SUITS,
STEINKE HOODS, SUBMARINE ESCAPE APPLICANCE,
*SUBMARINE ESCAPE SUITS

(U)

THE COMPATIBILITY OF THE BRITISH MARK VII
SUBMARINE ESCAPE IMMERSION SUIT (SEIS) WITH
SIDE EGRESS AND TUBE EGRESS UNITED STATES NAVY
ESCAPE TRUNK CONFIGURATIONS WAS EVALUATED. EGRESS
TIME WITH THE SEIS WAS COMPARED TO THAT WITH THE
STEINKE HOOD UNDER CONDITIONS OF INDIVIDUAL AND
GROUP ESCAPE (1, 2, AND 3 MAN TEAMS).

(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZCAI2

AD-729 735 6/7 6/19
ROYAL NAVAL PERSONNEL RESEARCH COMMITTEE LONDON
(ENGLAND)

A REVIEW OF SUBMARINE ESCAPE TRIALS FROM
1945 TO 1970 WITH PARTICULAR EMPHASIS ON
DECOMPRESSION SICKNESS.

(U)

OCT 70 39P DONALD K. W. ;
REPT. NO. UPS-290
MONITOR: NSTIC 30978

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPORT FOR THE UNDERWATER
PHYSIOLOGY SUBCOMMITTEE.

DESCRIPTORS: (*SUBMARINE ESCAPE, *DECOMPRESSION
SICKNESS), NITROGEN, TISSUES(BIOLOGY),
LABORATORY ANIMALS, MATHEMATICAL ANALYSIS, HUMANS,
EXPOSURE, CENTRAL NERVOUS SYSTEM, LUNGS, NAVAL
RESEARCH, GREAT BRITAIN

(U)

ALL SIMULATED AND ACTUAL SUBMARINE ESCAPE TRIALS
CARRIED OUT BY THE ROYAL NAVY FROM 1945 TO THE
PRESENT TIME ARE DESCRIBED AND TABULATED. AN
ATTEMPT HAS BEEN MADE TO INTEGRATE THESE RESULTS. A
FURTHER ATTEMPT HAS BEEN MADE TO ASSESS MORE
PRECISELY THE RISK OF DECOMPRESSION SICKNESS AFTER
SUBMARINE ESCAPES. THIS RISK HAS SO FAR BEEN
DETERMINED ENTIRELY BY TRIAL AND ERROR. THE
THEORETICAL BEHAVIOUR OF VARIOUS TISSUES IN THE BODY
DURING SUCH ESCAPES HAVE BEEN CALCULATED AND
CORRELATED WITH PAST RESULTS. A SIMPLE BUT
EFFECTIVE FORMULA IS PROPOSED TO ALLOW IMMEDIATE
ASSESSMENT OF THE RISK OF DECOMPRESSION SICKNESS
AFTER A PARTICULAR ESCAPE. THE POSSIBLE
CONTRIBUTION OF OXYGEN, AND OF THE OVERLOADING OF THE
'FAST' TISSUES WITH NITROGEN, TO THE CHANGING NATURE
OF DECOMPRESSION SICKNESS AFTER DEEP ESCAPES IS
DISCUSSED. THE FEASIBILITY OF EVEN DEEPER SUBMARINE
ESCAPES AND OTHER FUTURE DEVELOPMENTS ARE BRIEFLY
DISCUSSED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZCAI2

AD-730 711 6/7 13/10.1 6/17 5/5
NAVAL SUBMARINE MEDICAL RESEARCH LAB GROTON CONN

HUMAN FACTORS EVALUATION OF SUBMARINE
ESCAPE: II-A. TOP EGRESS WITH THE
BRITISH SUBMARINE ESCAPE IMMERSION SUIT AND
THE STEINKE HOOD.

(U)

DESCRIPTIVE NOTE: INTERIM REPT.,
OCT 70 29P RYACK, BERNARD L.; WALTERS,
GARY B.;
REPT. NO. SMRL-644
PROJ: MF12.524.006
MONITOR: NAVMED MF12.524.006-9025B-38

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-718 855.

DESCRIPTORS: (*SUBMARINE ESCAPE, HUMAN
ENGINEERING), (*UNDERWATER CLOTHING, SUBMARINE
ESCAPE), DECOMPRESSION SICKNESS, TIME, HATCHES,
SUBMARINE PERSONNEL, CORRELATION TECHNIQUES, SEA
RESCUE EQUIPMENT, TESTS

(U)

IDENTIFIERS: MARK 7 SUBMARINE ESCAPE SUITS,
*STEINKE HOODS, *SUBMARINE ESCAPE SUITS,
*SUBMARINE ESCAPE APPLIANCES, SIDE EGRESS ESCAPE
TRUNKS, TUBE EGRESS ESCAPE TRUNKS, TOP EGRESS
ESCAPE TRUNKS

(U)

THE BRITISH MARK VII SUBMARINE ESCAPE
IMMERSION SUIT (SEIS) WHICH PROVIDES THERMAL
PROTECTION AND THE STEINKE HOOD WHICH DOES NOT,
WERE EVALUATED FOR SINGLE-MAN AND GROUP ESCAPE (2-
AND 3-MAN TEAMS) FROM A SIMULATED TOP EGRESS
UNITED STATES NAVY ESCAPE TRUNK. FOR BOTH
ESCAPE APPLIANCES, EGRESS TIME INCREASED LINEARLY AS
A FUNCTION OF TEAM SIZE. THREE-MAN TEAMS AND TWO-
MAN TEAMS ESCAPED FASTER WITH THE SEIS THAN WITH
THE STEINKE HOOD; THERE WAS NO DIFFERENCE FOR
ONE-MAN ESCAPES. SINGLE-MAN ESCAPE TIMES WITH THE
SEIS WERE COMPARABLE TO THOSE OBTAINED BY THE
BRITISH. WHEN COMPARED WITH SIDE AND TUBE
EGRESS, TOP EGRESS OFFERS A SUBSTANTIAL REDUCTION IN
ESCAPE TIME AND THEREFORE IN TOTAL BOTTOM TIME.
SAFE ESCAPES FROM DEPTHS IN ACCESS OF 450 FEET BY
TEAMS OF MORE THAN TWO MEN ARE FEASIBLE FROM A TOP
HATCH CONFIGURATION BUT ARE NOT POSSIBLE FROM A SIDE
OR TUBE EGRESS CONFIGURATION. A SUBMARINE ESCAPE
SYSTEM EMPLOYING TOP EGRESS AND THE EXPOSURE
PROTECTION OF THE SEIS IS RECOMMENDED.

(AUTHOR)

21

(U)

UNCLASSIFIED

/ZCAI2

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZCAI2

AD-738 417 6/7 13/10.1
NAVAL ORDNANCE LAB WHITE OAK MD

REDUCED SIZE SECT/SAL SYSTEM,

(U)

OCT 71 53P FAULSTICH, ALBERT J., JR;
REPT. NO. NOLTR-72-11

UNCLASSIFIED REPORT

DESCRIPTORS: (*SUBMARINES, *SEA RESCUE EQUIPMENT),
(*BUOYS, SUBMARINES), RADIO TRANSMITTERS,
SIGNAL LIGHTS, ULTRAHIGH FREQUENCY, POSITION
FINDING, PROGRAMMING(COMPUTERS), NUCLEAR POWERED
VESSELS

(U)

IDENTIFIERS: SSN 688 CLASS VESSELS, SECT/SAL
BUOY SYSTEM, SECT(SUBMARINE EMERGENCY
COMMUNICATION TRANSMITTER), SUBMARINE
EMERGENCY COMMUNICATION TRANSMITTER

(U)

THE REPORT HAS BEEN PREPARED IN RESPONSE TO A
REQUEST BY THE OFFICE OF THE CHIEF OF NAVAL
OPERATIONS FOR THE DEVELOPMENT OF A MORE COMPACT
SIZE SECT/SAL BUOY SYSTEM FOR INSTALLATION ON
THOSE SUBMARINES WITH MINIMIZED SUPERSTRUCTURE AREAS.
DISCUSSION IS FOCUSED ON THE FOLLOWING AREAS:
NEW LAUNCHING TECHNIQUES FOR THE SECT BUOY;
POSSIBLE LAUNCHING LOCATIONS ON THE NEW 688 CLASS
SUBMARINE; NEW COMPONENTS FOR THE SECT BUOY;
IMPROVEMENTS IN THE PRESENT SECT BUOY SUBSYSTEMS;
POSSIBLE SECOND GENERATION REDUCED SIZE SECT
BUOYS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZCAI2

AD-850 749 6/5
OFFICE OF NAVAL RESEARCH LONDON (ENGLAND)

SOME NOTES ON UNDERWATER MEDICAL ACTIVITIES
IN THE NORWEGIAN AND DUTCH NAVIES.

(U)

DESCRIPTIVE NOTE: MEMORANDUM REPT.,
APR 69 11P SPHAR, RAYMOND L. ;
REPT. NO. ONRL-M-10-69

UNCLASSIFIED REPORT

DESCRIPTORS: (*MILITARY MEDICINE, NORWAY),
(*NETHERLANDS, MILITARY MEDICINE), SUBMARINE
ESCAPE, TRAINING, NAVAL PERSONNEL, DIVING,
PSYCHOMETRICS, SUBMARINES, MEDICAL EXAMINATION

(U)

A DESCRIPTION OF FACILITIES RELATING TO SUBMARINE
AND DIVING MEDICINE IN THE NORWEGIAN AND DUTCH
NAVIES IS GIVEN IN THIS MEMORANDUM. THE
NORWEGIANS ARE NOT PRESENTLY DOING RESEARCH IN THIS
FIELD, WHILE THE DUTCH ARE JUST STARTING A RESEARCH
PROGRAM. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZCAI2

AD-878 836 5/9 13/10.1
GENERAL DYNAMICS CORP GROTON CONN ELECTRIC BOAT DIV

A STUDY OF A GENERALIZED SUBMARINE ADVANCED
CASUALTY SHIP CONTROL TRAINING DEVICE.
VOLUME I. STUDY FINDINGS.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
AUG 70 157P LAMB, J. C. BERTSCHE, W.
R. MCAREY, R. G.;
CONTRACT: N61339-69-C-0117
PROJ: NAVTRADEVVCEN-8159
MONITOR: NAVTRADEVVCEN 69-C-0117-1

UNCLASSIFIED REPORT

DESCRIPTORS: (*SUBMARINE PERSONNEL, NAVAL
TRAINING), (*BALLISTIC MISSILE SUBMARINES,
DAMAGE), CONTROL SYSTEMS, SUBMARINE SIMULATORS,
PERSONNEL MANAGEMENT, MALFUNCTIONS,
FAILURE(MECHANICS), SHIP FIRES, AIR POLLUTION,
FAILURE(ELECTRONICS), MARINE PROPULSION,
PROGRAMMED INSTRUCTION, TRAINING DEVICES

(U)

IDENTIFIERS: GROUNDING, TASK ANALYSIS,
COLLISIONS, *SUBMARINE CASUALTY CONTROL,
*EMERGENCY SHIP CONTROL, FLOODING, SHIP CONTROL
TRAINING

(U)

THE REPORT PRESENTS THE RESULTS OF A STUDY DESIGNED
TO (1) EVALUATE THE FEASIBILITY OF PROVIDING
MULTI-CLASS EMERGENCY SHIP CONTROL TRAINING BY MEANS
OF A GENERALIZED CASUALTY CONTROL TRAINING DEVICE,
(2) DERIVE DETAILED FUNCTIONAL CHARACTERISTICS
FOR SUCH A DEVICE, AND (3) DETERMINE THE
IMPLICATIONS OF THIS CONCEPT FOR THE NAVY'S
EXISTING SUBMERGED SHIP CONTROL TRAINING PROGRAM.
TASK/SYSTEM ANALYSIS TECHNIQUES WERE USED TO ASSESS
THE DEGREE OF COMMONALITY AMONG THE VARIOUS CLASSES
OF NUCLEAR SUBMARINES WITH RESPECT TO POTENTIAL
CASUALTY SITUATIONS, THE CRITICALITY OF DISPLAY AND
CONTROL ELEMENTS, AND THE CHARACTERISTICS OF THE
PERSONNEL TO BE TRAINED. COMPOSITE REQUIREMENTS FOR
ADVANCED CASUALTY CONTROL SIMULATION AND TRAINING IN
ALL CLASSES OF NUCLEAR ATTACK AND BALLISTIC MISSILE
SUBMARINES WERE DERIVED AND USED AS THE BASIS FOR
DETERMINING THE SPECIFIC FUNCTIONAL CHARACTERISTICS
OF A PROPOSED GENERALIZED TRAINING SYSTEM. IN
ADDITION, THE OVERALL SUBMARINE SHIP CONTROL TRAINING
PROGRAM WAS EXAMINED AND VARIOUS RECOMMENDATIONS WERE
MADE CONCERNING THE INTEGRATION OF THE PROPOSED
TRAINING DEVICE IN THE PROGRAM. (AUTHOR)

(U)

**II. DEEP SUBMERGENCE VESSELS, SEARCH
TECHNIQUES AND EXPLORATION**

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZBAII

AD-692 411 13/10 8/10
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF

OCEAN SEDIMENT HOLDING STRENGTH AGAINST BREAKOUT OF
EMBEDDED OBJECTS. (U)

DESCRIPTIVE NOTE: FINAL REPT. JUL 67-JUL 68.
AUG 69 78P LIU, CHEN L. ;
REPT. NO. NCEL-TR-635
PROJ: NCEL-56-001

UNCLASSIFIED REPORT

DESCRIPTORS: (*OCEAN BOTTOM, UNDERWATER OBJECTS),
(*UNDERWATER OBJECTS, RECOVERY), SOIL MECHANICS,
SEDIMENTATION, SALVAGE, SEA RESCUES,
FORCE(MECHANICS), MODELS(SIMULATIONS),
EXPERIMENTAL DATA, CONTINUUM MECHANICS, MEXICO
GULF, GEOMETRIC FORMS, WEIGHT, EQUATIONS,
ERRORS, TIME, TEST FACILITIES (U)

IDENTIFIERS: *UNDERWATER EMBEDDED OBJECTS,
RETAINING, HOISTING, COHESION (U)

THE REPORT CONCLUDES 3 YEARS OF BREAKOUT FORCE
RESEARCH. THE THIRD PHASE OF THE FIELD TEST
CONDUCTED IN THE GULF OF MEXICO AND A SMALL-SCALE
MODEL STUDY ARE DESCRIBED. ALL OF THE EXPERIMENTAL
RESULTS ARE PRESENTED IN A NEW DIMENSIONLESS
CORRELATION (BETWEEN BREADOUT FORCE AND BREAKOUT
TIME) BASED ON THE MECHANISM OF THE BREAKOUT.
THE MEAN SOIL HOLDING STRENGTH IS CONSIDERED TO
DEPEND UPON AVERAGE SOIL COHESION, OBJECT GEOMETRY,
THE TIME THE OBJECT HAS BEEN EMBEDDED, AND THE TIME
ALLOWED FOR PULLOUT. AN EXAMPLE IS PRESENTED TO
ILLUSTRATE THE APPLICATION OF THIS EQUATION. THE
SMALL-SCALE MODEL TEST IS CONSIDERED A USEFUL TOOL IN
OBTAINING MORE DATA IN FUTURE RESEARCH.

(AUTHOR) (U)

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UNCLASSIFIED

DDC REPORT BIRLIOGRAPHY SEARCH CONTROL NO. /ZBAII

AD-702 662 13/10
LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF
BIOTECHNOLOGY

THE USE OF MOCKUPS IN THE DESIGN OF A DEEP
SUBMERGENCE RESCUE VEHICLE.

(U)

70 7P JANOUSEK, JAMES A. ;
CONTRACT: NOBS-63(A)

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN HUMAN FACTORS, V12 N1 P63-
68 FEB 70.

DESCRIPTORS: (*UNDERWATER VEHICLES, RESCUES),
MODELS(SIMULATIONS), DEEP SUBMERGENCE, DESIGN,
SAFETY HARNESS

(U)

IDENTIFIERS: DSRV(DEEP SUBMERGENCE RESCUE
VEHICLES), *DEEP SUBMERGENCE RESCUE
VEHICLES

(U)

THE PAPER BRIEFLY DESCRIBES HOW THE HUMAN FACTORS
ENGINEERING TEAM USED A VARIETY OF MOCKUPS TO
ESTABLISH DESIGN CONCEPTS WHICH WERE DEVELOPED INTO
FURNISHINGS FOR A MANNED UNDERWATER VEHICLE.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZBAII

AD-705 167 6/7 13/10.1
LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF

STUDY OF METHODS AND DEVICES FOR LOCATING SMALL
DISTRESSED SUBMERSIBLES. (U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT.,
FEB 70 233P THOMAS,V. N. ;GERMERAAD,D.
P. ;ANDRIS,R. ;BENTKOWSKY,J. ;BROPHY,J. ;
REPT. NO. LMSC-D052449
CONTRACT: DOT-CG-93019-A

UNCLASSIFIED REPORT

DESCRIPTORS: (*UNDERWATER VEHICLES, SEA RESCUES),
(*SEA RESCUE EQUIPMENT, UNDERWATER VEHICLES),
DESIGN, UNDERWATER OBJECT LOCATORS, UNDERWATER
TRACKING, UNDERWATER TELEPHONES, SONAR EQUIPMENT,
SONAR SIGNALS, SIGNAL LIGHTS, RADIO SONO BUOYS,
PROBABILITY, NUMERICAL ANALYSIS, HUMAN
ENGINEERING, COAST GUARD RESEARCH (U)

IDENTIFIERS: SARS(SEARCH AND RESCUE
SUBMERSIBLES), SEARCH AND RESCUE SUBMERSIBLES,
*MANAGEMENT INFORMATION SYSTEMS (U)

THE TASK OF LOCATING A COOPERATIVE SUBMARINE,
EQUIPPED WITH LOCATOR AIDS, IS COMPARED TO THAT OF
LOCATING A NONCOOPERATIVE SUBMARINE. IT IS SHOWN
THAT, IF A COOPERATIVE SEARCH CAN BE UNDERTAKEN, THE
SEARCH AND LOCATION OPERATION IS NOT THE CRITICAL
TIME SEGMENT OF THE RESCUE MISSION. IF A
NONCOOPERATIVE SEARCH MUST BE UNDERTAKEN, SEARCH AND
LOCATION BECOMES THE CRITICAL TIME ELEMENT. THE
MOST USEFUL LOCATOR AID IS FOUND TO BE THE UNDERWATER
TELEPHONE, WITH WHICH ALL SUBMERSIBLES ARE EQUIPPED.
A GENERALIZED MATHEMATICAL TREATMENT IS GIVEN,
WHERE THE CHARACTERISTICS OF THE SEARCH EQUIPMENT,
THE SEARCH VEHICLE, AND THE ENVIRONMENT ARE TREATED
IN PARAMETRIC FORM, ALONG WITH THE UNCERTAINTY IN THE
LOCATION OF THE DISTRESSED SUBMERSIBLE (DISSUB).
PARAMETRIC ANALYSIS IS APPLIED TO OBTAIN REALISTIC
PERFORMANCE PREDICTIONS. FOR THE COOPERATIVE
SEARCH, RESULTS ARE PRESENTED IN THE FORM OF LOCATION
TIME VS. RANGE TO THE DISTRESSED SUBMERSIBLE. FOR
THE NONCOOPERATIVE SEARCH, THE RESULTS ARE PRESENTED
IN THE FORM OF CURVES OF TIME TO LOCATE VS.
PROBABILITY OF SUCCESS. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZBAII

AD-709 141 13/10 5/9
NAVAL PERSONNEL RESEARCH AND DEVELOPMENT LAB WASHINGTON D C

PERSONNEL AND TRAINING REQUIREMENTS FOR THE ASR-21
RESCUE CONTROL CENTER. (U)

DESCRIPTIVE NOTE: PRELIMINARY REPT. JAN-OCT 69,
JUN 70 34P DELUCA, JOSEPH F.; NOBLE,
JOHN F.;
REPT. NO. WRR-70-9

UNCLASSIFIED REPORT

DESCRIPTORS: (*UNDERWATER VEHICLES, SEA RESCUES),
(*NAVAL TRAINING, DEEP SUBMERGENCE), SUBMARINE
ESCAPE, CATAMARANS, SONAR PERSONNEL, MAINTENANCE
PERSONNEL, CONTROL SYSTEMS, TRACKING, COMPUTER
PERSONNEL, DATA PROCESSING SYSTEMS, SONAR EQUIPMENT,
PROGRAMMED INSTRUCTION, VIEWING SCREENS (J)

IDENTIFIERS: ASR-21 VESSEL, DEEP SUBMERGENCE
RESCUE VEHICLES (U)

THE REPORT CONCERNS ITSELF WITH THE IDENTIFICATION
OF PERSONNEL AND TRAINING REQUIREMENTS FOR THE
RESCUE CONTROL CENTER (RCC), ASR-21
CLASS. INFORMATION IN THIS REPORT WILL BE
UTILIZED IN ESTABLISHING INITIAL TRAINING COURSES AND
THE INITIAL TRAINING SITE FOR ASR-21 AND ASR-22
PERSONNEL. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZBAI1

AD-709 393 13/10
ASSOCIATION OF SENIOR ENGINEERS (NAVSHIPS) WASHINGTON D C

1970 ANNUAL TECHNICAL SYMPOSIUM (7TH).
MECHANICAL SYSTEMS FOR OCEAN ENGINEERING. (U)

70 58P SOUTHERLAND, ARTHUR, JR.

UNCLASSIFIED REPORT

DESCRIPTORS: (*UNDERWATER VEHICLES, RECOVERY),
DEEP SUBMERGENCE, STABILIZED PLATFORMS, TEST
EQUIPMENT, CONTROL SYSTEMS, UNDERWATER EQUIPMENT,
PAYLOAD, CABLES(MECHANICAL), HANDLING,
DIVING, CONFIGURATION, SEA RESCUE EQUIPMENT,
RESCUES, SUBMARINES, HYDRAULIC SERVOMECHANISMS (U)
IDENTIFIERS: ALVIN VESSEL (U)

THE PAPER DISCUSSES MECHANICAL HANDLING SYSTEMS
DESIGN CONSIDERATIONS, PERFORMANCE REQUIREMENTS AND
PROBLEM AREAS ASSOCIATED WITH SALVAGE AND RESCUE
OPERATIONS INCLUDING HANDLING OF SUBMERSIBLE VEHICLES
AND OTHER LARGE OBJECTS AT SEA. SHIP MOTION
RESPONSE TO VARIOUS SEA CONDITIONS AND THE
CAPABILITIES AND LIMITATIONS OF PRESENT HANDLING
METHODS ARE EVALUATED. EMPHASIS IS PLACED ON THE
EFFECT OF DYNAMIC LOADS IMPOSED ON THE HANDLING GEAR
AND METHODS OF LOAD ATTENUATION AND MOTION
COMPENSATION. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZBAI1

AD-740 751 13/10
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF

UNAIDED BREAKOUT OF PARTIALLY EMBEDDED
OBJECTS FROM COHESIVE SEAFLOOR SOILS.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 1965-1971,
FEB 72 58P LEE, H. J.;
REPT. NO. NCEL-TR-755
PROJ: YF38.535.002
TASK: 01009

UNCLASSIFIED REPORT

DESCRIPTORS: (*OCEAN BOTTOM, SOIL MECHANICS),
(*UNDERWATER OBJECTS, SALVAGE),
FORCE(MECHANICS), SEA RESCUES, PREDICTIONS,
REMOVAL, SEDIMENTATION, MUD, CLAY, TEST
METHODS

(U)

IDENTIFIERS: *MARINE SALVAGE

(U)

THE NAVAL CIVIL ENGINEERING LABORATORY HAS CONDUCTED FIELD AND LABORATORY TESTS TO INVESTIGATE THE EFFORT REQUIRED TO REMOVE PARTIALLY EMBEDDED OBJECTS FROM COHESIVE SEAFLOOR SOILS. THIS WORK IS INTENDED TO AID IN PROPER SELECTION OF ELEMENTS FOR NAVY SALVAGE AND RESCUE OPERATIONS. THIS REPORT PRESENTS THE RESULTS OF THE TESTS AND AN ANALYSIS OF THE RESULTS. PROCEDURES ARE GIVEN FOR USE BY FIELD ENGINEERS IN PREDICTING FORCES REQUIRED TO REMOVE OBJECTS IMMEDIATELY AND IN ESTIMATING TIMES REQUIRED WHEN LESSER FORCES ARE APPLIED. THE ACCURACY OF THE FORCE PREDICTION PROCEDURE IS ABOUT PLUS OR MINUS 50%; THE ACCURACY OF THE TIME PREDICTION PROCEDURE IS ABOUT PLUS OR MINUS 100%. THESE ACCURACIES ARE COMPARABLE TO THOSE USUALLY ATTAINABLE WITH OTHER TIME-DEPENDENT SOIL MECHANICS PROBLEMS AND SHOULD BE ACCEPTABLE FOR TYPICAL OBJECT RETRIEVAL OPERATIONS.

(AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZBAII

AD-750 736 13/10 5/2
NORTHROP CORP SILVER SPRING MD ELECTRO-MECHANICAL DIV

DEEP SUBMERGENCE SYSTEMS TERMINOLOGY AND
USAGE.

(U)

JUN 70 77P
CONTRACT: N00024-70-C-0201
MONITOR: DSSP TD-19-REV-B

UNCLASSIFIED REPORT

DESCRIPTORS: (*MARINE ENGINEERING, *DICTIONARIES),
(*DEEP SUBMERGENCE, MARINE ENGINEERING),
INSTRUCTION MANUALS, UNDERWATER EQUIPMENT, NAVAL
OPERATIONS, NAVAL EQUIPMENT, OCEANOGRAPHIC
EQUIPMENT, SALVAGE, SEA RESCUES

(U)

THE REPORT PRESENTS TERMINOLOGY AND USAGE PECULIAR
TO THE DEEP SUBMERGENCE SYSTEMS PROJECT. THE
DOCUMENT IS INTENDED TO SERVE AS A REFERENCE AND
GUIDE FOR GOVERNMENT AND CONTRACTOR ORGANIZATIONS
ENGAGED IN THE PREPARATION OF MANUALS, TECHNICAL
DOCUMENTS, DRAWINGS, AND OTHER MATERIAL FOR DSSP.
(AUTHOR)

(U)

UNCLASSIFIED

CORPORATE AUTHOR - MONITORING AGENCY

*ASSOCIATION OF SENIOR ENGINEERS
(NAVSHIPS) WASHINGTON D C

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COLUMBUS LABS

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AD-709 395

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CONCEPTUAL DESIGN.
AD-712 546

*BUREAU OF MEDICINE AND SURGERY
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OF DEPTHS IN BREATHOLD DIVING.
AD-675 815

*COAST GUARD WASHINGTON D C APPLIED
TECHNOLOGY DIV

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AD-709 463

*DEEP SUBMERGENCE SYSTEMS PROJECT
OFFICE ARLINGTON VA

• • •
DSSP-TD-19-REV-B
DEEP SUBMERGENCE SYSTEMS
TERMINOLOGY AND USAGE.
AD-750 726

*DEFENSE DOCUMENTATION CENTER
ALEXANDRIA VA

• • •
DDC-TAS-68-1
SUBMARINE ESCAPE AND RESCUE.
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AD-674 390

*GENERAL DYNAMICS CORP GROTON CONN
ELECTRIC BOAT DIV

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STUDY FINDINGS.
(NAVTRADEVcen-69-C-0117-1)
AD-878 836

*LIBRARY OF CONGRESS WASHINGTON D C
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ATD-67-7
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UNDERWATER PHYSIOLOGY.
AD-666 398

*LOCKHEED MISSILES AND SPACE CO
SUNNYVALE CALIF

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LMSC-D027780-1
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LMSC-D052449
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*LOCKHEED MISSILES AND SPACE CO
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*NAVAL AIR DEVELOPMENT CENTER
JOHNSVILLE PA AEROSPACE CREW
EQUIPMENT DEPT

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NADC-AC-7006
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*NAVAL ORDNANCE LAB WHITE OAK MD

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*NAVAL PERSONNEL RESEARCH AND
DEVELOPMENT LAB WASHINGTON D C

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WRR-71-3

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*NAVAL SCIENTIFIC AND TECHNICAL
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(ENGLAND)

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AD-718 855

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SMRL-519

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*NAVAL TRAINING DEVICE CENTER ORLANDO
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*SUBMARINE PERSONNEL
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